BMP: CULVERT INLET PROTECTION

Definition

A sediment filter located at the inlet to storm sewer culverts.

Purposes

1. To prevent sediment from entering, accumulating in and being transferred by a culvert and associated drainage system prior to permanent stabilization of a disturbed project area.

2. To provide erosion control at culvert inlets during the phase of a project where elevation and drainage patterns change, causing original control measures to be ineffective or in need of removal.

Conditions Where Practice Applies

Where culvert and associated drainage system is to be made operational prior to permanent stabilization of the disturbed drainage area. Different types of structures are applicable to different conditions.

Planning Considerations

When construction on a project reaches a stage where culverts and other storm sewer appurtenances are installed and many areas are brought to a desired grade, the erosion control measures used in the early stages normally need to be modified or may need to be removed altogether. At that time, there is a need to provide protection at the points where runoff will leave the area via culverts and drop or curb inlets.

Similar to drop and curb inlets, culverts which are made operational prior to stabilization of the associated drainage areas can convey large amounts of sediment to natural drainageways. In case of extreme sediment loading, the pipe or pipe system itself may clog and lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the culvert by using one of the methods noted in this section.

General Guidelines (All Types)

1. The inlet protection device shall be constructed in a manner that will facilitate cleanout and disposal of trapped sediment and minimize interference with construction activities.

2. The inlet protection devices shall be constructed in such a manner that any resultant ponding of stormwater will not cause excessive inconvenience or damage to adjacent areas or structures.

Design Criteria

1. Silt Fence Culvert Inlet Protection

   a. No formal design is required.

   b. Silt fence culvert inlet protection has an expected maximum usable life of three months.

   c. The maximum area draining to this practice shall not exceed 4,000 square meters (1 acre).

2. Culvert Inlet Sediment Trap

   a. Runoff storage requirements shall be in accordance with information outlined under BMP-13, TEMPORARY SEDIMENT TRAP.

   b. Culvert inlet sediment traps have a maximum expected useful life of 18 months.

   c. The maximum area draining to this practice shall not exceed 1,200 square meters (3 acres).

Construction Specifications

1. Silt Fence Culvert Inlet Protection

   a. The height of the silt fence (in front of the culvert opening) shall be a minimum of 400 millimeters (16 inches) and shall not exceed 1 meter (3 feet).

b. Extra strength filter fabric with a maximum spacing of stakes of 1 meter shall be used to construct the measure.

c. The placement of silt fence should be approximately 2 meters (6 feet) from the culvert in the direction of incoming flow, creating a "horseshoe" shape.

d. If silt fence cannot be installed properly or the flow and/or velocity of flow to the culvert protection is excessive and may breach the structure, stone protection should be incorporated with fence installation.

2. Culvert Inlet Sediment Trap

a. Geometry of the design will be a "horseshoe" shape around the culvert inlet.

b. The toe of riprap (composing the sediment filter dam) shall be no closer than 600 millimeters (24 inches) from the culvert opening in order to provide an acceptable emergency outlet for flows from larger storm events.

c. All other "Construction Specifications" found within BMP-13, TEMPORARY SEDIMENT TRAP, also apply to this practice.

e. The proper installation of the culvert inlet sediment trap is a viable substitute for the installation of the TEMPORARY SEDIMENT TRAP.

Maintenance

1. The structure shall be inspected after each rain and repairs made as needed.

2. Aggregate shall be replaced or cleaned when inspection reveals that clogged voids are causing ponding problems which interfere with on-site construction.

3. Sediment shall be removed and the impoundment restored to its original dimensions when sediment has accumulated to one-half the design depth. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems.

4. Temporary structures shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.